



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Burn Injuries

Effects of Burn Injuries on Thermoregulatory and Cardiovascular Responses: Implications for the Standards of Medical Fitness

Researchers at the University of Texas Southwestern Medical Center at Dallas, (Dallas, Texas), set out to obtain the necessary data and provide the U.S. Army with scientifically supported recommendations for a revised Standards of Medical Fitness that will result in improved health, safety, and performance of the Service member, while balancing the adverse consequences of unjustifiably excluding new recruits and medically discharging current Service members who sustain a significant burn injury.

The first aim investigated whether the absolute effective body surface area (BSA) or the percent BSA burned best predicts the core temperature response to exercise in the heat. Sixteen healthy non-burned individuals (eight large and eight small) were recruited. On separate occasions, subjects cycled at ~100 Watts for one hour in 39 degrees Celsius, 20 percent relative humidity environment with a simulated burn injury of 0 or 40 percent total BSA. A simulated 40 percent burn injury reduced the effective BSA to 1.35 ± 0.05 meters squared and 1.01 ± 0.07 meters squared in large and small groups, respectively. Greater elevations in core temperature were observed in small, irrespective of condition. For both groups, the elevation in core temperature was exacerbated by the 40 percent simulated burn ($p < 0.01$), yet the magnitude of the increase in core temperature from 0 to 40 percent simulated burn was not different between groups ($p = 0.37$). Despite the same 40 percent BSA burned, smaller individuals showed a ~0.75 degrees Celsius greater elevation in core temperature during exercise.

In exercise-based rehabilitation or physically demanding occupational settings, activities performed at the same absolute intensity will place burn survivors of smaller body size, but with the same percent BSA burned, at greater risk for hyperthermia. The findings could impact recruitment of individuals with burns that would have normally disqualified them from joining, and help retain highly trained Service members who have completed rehabilitation following burn injuries.

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